State Water Resources Control Board

UST CASE CLOSURE REVIEW SUMMARY REPORT

Agency Information

Agency Name: Santa Cruz County Environmental Health Services (County)	Address: 701 Ocean Street, Room 312 Santa Cruz, CA 95060
Agency Caseworker: Scott Carson	Case No.: RO0000050

Case Information

USTCF Claim No.: 5076	Global ID: T0608700255
Site Name: Former Shell Station	Site Address: 745 Ocean Street Santa Cruz, CA 95060
Responsible Party: Equilon Enterprises LLC	Address: 20945 South Wilmington Avenue, Carson, CA 90810
USTCF Expenditures to Date: $1,490,000	Number of Years Case Open: 27

URL: http://geotracker.waterboards.ca.gov/profile_report.asp?global_id=T0608700255

Summary

The Low-Threat Underground Storage Tank (UST) Case Closure Policy (Policy) contains general and media-specific criteria, and cases that meet those criteria are appropriate for closure pursuant to the Policy. This case meets all of the required criteria of the Policy. A summary evaluation of compliance with the Policy is shown in **Attachment 1: Compliance with State Water Board Policies and State Law**. The Conceptual Site Model upon which the evaluation of the case has been made is described in **Attachment 2: Summary of Basic Case Information (Conceptual Site Model).** Highlights of the case follow:

The Site is a vacant lot located on the southwest corner of Water and Ocean Streets. A Shell service station was located at the Site until 2005. An unauthorized release was reported in December 1985 following the removal of three gasoline USTs. Between July and December 2005, the station building, canopy, dispensers, and three additional USTs were removed. Land use in the vicinity of the Site is commercial. Groundwater extraction reportedly removed 19 pounds of free product and 15.2 pounds of total petroleum hydrocarbons as gasoline (TPHg). Soil vapor extraction (SVE) removed approximately 690 pounds of TPHg. Mobile dual phase extraction removed a reported 1.81 pounds of TPHg and 0.15 pounds of methyl-tertiary butyl ether (MTBE). Over 3,000 cubic yards of contaminated soil have been removed from the Site. Eighteen monitoring wells have been installed and monitored since 1985. According to groundwater data, water quality objectives have been achieved for all constituents except benzene, MTBE, and tert butyl alcohol (TBA).

The petroleum release is limited to the shallow groundwater and soil. According to data available in GeoTracker, there are no supply wells regulated by the California Department of Public Health or surface water bodies within 250 feet of the defined plume boundary. No other water supply wells have been identified within 250 feet of the defined plume boundary in files reviewed.

Water is provided to water users near the Site by the City of Santa Cruz Water Department. The affected groundwater is not currently being used as a source of drinking water, and it is highly unlikely that the affected groundwater will be used as a source of drinking water in the foreseeable future. Other designated beneficial uses of impacted groundwater are not threatened and it is highly unlikely that they will be, considering these factors in the context of the site setting. Remaining petroleum hydrocarbon constituents are limited and stable, and concentrations are decreasing. Corrective actions have been implemented and additional corrective actions are not necessary. Any remaining petroleum hydrocarbon constituents do not pose a significant risk to human health, safety or the environment.

Rationale for Closure under the Policy

- General Criteria: The case meets all eight Policy general criteria.
- Groundwater Specific Criteria: The case meets Policy Criterion 1 by Class 1. The contaminant plume that exceeds water quality objectives is less than 100 feet in length. There is no free product. The nearest water supply well or surface water body is greater than 250 feet from the defined plume boundary.
- Vapor Intrusion to Indoor Air: The case meets Policy Criterion 2a by Scenario 4 with a bioattenuation zone. The maximum benzene, ethylbenzene, and naphthalene concentrations in soil gas are less than 280,000 micrograms per cubic meter ($\mu g/m^3$), 3,600,000 $\mu g/m^3$, and 310,000 $\mu g/m^3$, respectively, at a depth of five feet. These levels meet the Commercial soil gas criteria where the soil gas sample locations are overlain by soil containing less than 100 mg/kg of TPH where the oxygen soil vapor concentration is equal to or greater than 4 percent. Soil data used consisted of the fourteen confirmation borings located within the buildable area of the Site (10-foot minimum setback) and representative of site conditions. Furthermore, the City is requiring that the rights of way on both the north and east sides of the Site be expanded (a right hand turn lane on Water Street and a 15 foot sidewalk on Ocean Street) as a part of any development of the Site property (email communication from Reid P. Schantz, Esq., legal representative for the property owner, Richard Rivoir, September 25, 2013).
- Direct Contact and Outdoor Air Exposure: The case meets Policy Criterion 3a. Maximum concentrations in soil are less than those in Policy Table 1 for Commercial/Industrial use, and the concentration limits for a Utility Worker are not exceeded. There are no soil sample results in the case record for naphthalene. However, the relative concentration of naphthalene in soil can be conservatively estimated using the published relative concentrations of naphthalene and benzene in gasoline. Taken from Potter and Simmons (1998), gasoline mixtures contain approximately 2 percent benzene and 0.25 percent naphthalene. Therefore, benzene can be directly substituted for naphthalene concentrations with a safety factor of eight. Benzene concentrations from the Site are below the naphthalene thresholds in Policy Table 1. Therefore, the estimated naphthalene concentrations meet the thresholds in Table 1 and the Policy criteria for direct contact by a factor of eight. It is highly unlikely that naphthalene concentrations in the soil, if any, exceed the threshold.

Objections to Closure and Responses

In their December 2012 letter, the County objects to UST case closure because:

- During the most recent soil gas sampling event in September 2010, soil vapor concentrations at four locations exceeded the direct measurement of soil gas criteria under Scenario 4 (1 of 2) of the Low Threat Closure Policy.

RESPONSE: Soil vapor concentrations meet the direct measurement of soil gas criteria under Scenario 4 (2 of 2) (with bioattenuation zone) under the Policy. The maximum benzene, ethylbenzene, and naphthalene concentrations in soil gas are less than 280,000 µg/m^3, 3,600,000 µg/m^3, and 310,000 µg/m^3, respectively, at a depth of five feet. These levels meet the Commercial soil gas criteria where the soil gas sample locations are overlain by soil containing less than 100 mg/kg of TPH where the oxygen soil vapor concentration is equal to or greater than 4 percent. Soil data used consisted of the fourteen confirmation borings located within the buildable area of the Site (10-foot minimum setback) and representative of site conditions.

- The County understands from the current property owner that it is fairly likely that development of the property will result in residential-over-commercial construction.
  RESPONSE: The two parcels that constitute the property, Assessor Parcel Numbers 00526132 and 00526134, are zoned as commercial by the County of Santa Cruz. The property is located at a major intersection in a commercial district, and is not likely to be rezoned as residential in the near-term future. Closure criteria are met for current land use, and are not required to be met for future potential land use. The developer will be required to meet any future land use requirements.
- Elevated benzene may remain in soil along the northern property boundary and roadway. Significant exposure to the soil impacts remaining under the northern and eastern edges of the property and beneath the Water and Ocean Street areas is only likely if excavation or construction were to occur on the subject property or in the public right of ways. Case closure should include the following condition:

  "The Santa Cruz County Environmental Health Service (SCCEHS) has a site-specific condition for this case closure. Soil chemical concentrations may remain above health and/or ecological risk-based screening levels in limited areas along the northern and eastern property boundaries. Although the elevated chemical concentrations may decrease with time and do not currently present an unacceptable health and/or ecological risk, acceptable risk levels could be exceeded if construction activities occur or if there are changes in site configuration or use. Therefore, prior to any digging or excavation in the impacted areas or any future changes to the site configuration or use, the property owner is required to notify SCCEHS for further evaluation of any special requirements that may be appropriate to protect human health and/or the environment."

  RESPONSE: The City is planning, as a required part of development of the site property, to add a right-hand turn lane on Water Street and to expand the sidewalk on Ocean Street to 15 feet and is expected to proceed with these improvements either sometime this fall or early next spring (email communication from Reid P. Schantz, Esq., September 25, 2013). This expansion of the City rights of way ensure that the remaining soil contamination on the north and east boundaries of the Site are not likely to be encountered during future construction on the property. The notification condition for case closure is unnecessary.
- Elevated arsenic remains in soil along the northern and eastern property boundaries and roadways as well as adjacent to probe V-9. The source of the arsenic in these areas is unclear. Without additional information, we do not believe it is reasonable to hold the Responsible Party or the current property owner for the former Shell site responsible for arsenic that is present off-site.
  RESPONSE: The Fund concurs. Conestoga-Rovers & Associates states "...arsenic in soil beneath the site appears to be consistent with background concentrations, and no further investigation or remediation appears necessary". In addition, petroleum USTs are not a source a source of arsenic.

Determination
Based on the review performed in accordance with Health & Safety Code Section 25299.39.2 subdivision (a), the Fund Manager has determined that closure of the case is appropriate.

Recommendation for Closure
Based on available information, residual petroleum hydrocarbons at the Site do not pose a significant risk to human health, safety, or the environment, and the case meets the requirements of the Policy. Accordingly, the Fund Manager recommends that the case be closed. The State Water Board is conducting public notification as required by the Policy. Santa Cruz County has the regulatory responsibility to supervise the abandonment of monitoring wells.

Lisa Babcock — 12/14/13

Lisa Babcock, P.G. 3939, C.E.G. 1235 — **Date**

Prepared by: Roger Hoffmore, P.G. 7660

ATTACHMENT 1: COMPLIANCE WITH STATE WATER BOARD POLICIES AND STATE LAW

The case complies with the State Water Resources Control Board policies and state law. Section 25296.10 of the Health and Safety Code requires that sites be cleaned up to protect human health, safety, and the environment. Based on available information, any residual petroleum constituents at the site do not pose significant risk to human health, safety, or the environment.

The case complies with the requirements of the Low-Threat Underground Storage Tank (UST) Case Closure Policy as described below.[1]

Is corrective action consistent with Chapter 6.7 of the Health and Safety Code and implementing regulations? The corrective action provisions contained in Chapter 6.7 of the Health and Safety Code and the implementing regulations govern the entire corrective action process at leaking UST sites. If it is determined, at any stage in the corrective action process, that UST site closure is appropriate, further compliance with corrective action requirements is not necessary. Corrective action at this site has been consistent with Chapter 6.7 of the Health and Safety Code and implementing regulations and, since this case meets applicable case-closure requirements, further corrective action is not necessary, unless the activity is necessary for case closure.	☒ Yes ☐ No
Have waste discharge requirements or any other orders issued pursuant to Division 7 of the Water Code been issued at this case?	☐ Yes ☒ No
If so, was the corrective action performed consistent with any order?	☐ Yes ☐ No ☒ NA
General Criteria General criteria that must be satisfied by all candidate sites:	
Is the unauthorized release located within the service area of a public water system?	☒ Yes ☐ No
Does the unauthorized release consist only of petroleum?	☒ Yes ☐ No
Has the unauthorized ("primary") release from the UST system been stopped?	☒ Yes ☐ No
Has free product been removed to the maximum extent practicable?	☒ Yes ☐ No ☐ NA
Has a conceptual site model that assesses the nature, extent, and mobility of the release been developed?	☒ Yes ☐ No

[1] Refer to the Low-Threat Underground Storage Tank Case Closure Policy for closure criteria for low-threat petroleum UST sites.
http://www.waterboards.ca.gov/board_decisions/adopted_orders/resolutions/2012/rs2012_0016atta.pdf

Has secondary source been removed to the extent practicable?	☒ Yes ☐ No
Has soil or groundwater been tested for MTBE and results reported in accordance with Health and Safety Code Section 25296.15?	☒ Yes ☐ No
Nuisance as defined by Water Code section 13050 does not exist at the site?	☒ Yes ☐ No
Are there unique site attributes or site-specific conditions that demonstrably increase the risk associated with residual petroleum constituents?	☐ Yes ☒ No
Media-Specific Criteria Candidate sites must satisfy all three of these media-specific criteria: **1. Groundwater:** To satisfy the media-specific criteria for groundwater, the contaminant plume that exceeds water quality objectives must be stable or decreasing in areal extent, and meet all of the additional characteristics of one of the five classes of sites:	
Is the contaminant plume that exceeds water quality objectives stable or decreasing in areal extent?	☒ Yes ☐ No ☐ NA
Does the contaminant plume that exceeds water quality objectives meet all of the additional characteristics of one of the five classes of sites?	☒ Yes ☐ No ☐ NA
If YES, check applicable class: ☒ **1** ☐ **2** ☐ **3** ☐ **4** ☐ **5**	
For sites with releases that have not affected groundwater, do mobile constituents (leachate, vapors, or light non-aqueous phase liquids) contain sufficient mobile constituents to cause groundwater to exceed the groundwater criteria?	☐ Yes ☐ No ☒ NA
2. Petroleum Vapor Intrusion to Indoor Air: The site is considered low-threat for vapor intrusion to indoor air if site-specific conditions satisfy all of the characteristics of one of the three classes of sites (a through c) or if the exception for active commercial fueling facilities applies.	
Is the site an active commercial petroleum fueling facility? Exception: Satisfaction of the media-specific criteria for petroleum vapor intrusion to indoor air is not required at active commercial petroleum fueling facilities, except in cases where release characteristics can be reasonably believed to pose an unacceptable health risk.	☐ Yes ☒ No
a. Do site-specific conditions at the release site satisfy all of the applicable characteristics and criteria of scenarios 1 through 3 or all of the applicable characteristics and criteria of scenario 4?	☒Yes ☐ No ☐ NA

If YES, check applicable scenarios: ☐ **1** ☐ **2** ☐ **3** ☒ **4** **b. Has a site-specific risk assessment for the vapor intrusion pathway been conducted and demonstrates that human health is protected to the satisfaction of the regulatory agency?**	☐ Yes ☐ No ☒ NA
c. As a result of controlling exposure through the use of mitigation measures or through the use of institutional or engineering controls, has the regulatory agency determined that petroleum vapors migrating from soil or groundwater will have no significant risk of adversely affecting human health?	☐ Yes ☐ No ☒ NA
3. Direct Contact and Outdoor Air Exposure: The site is considered low-threat for direct contact and outdoor air exposure if site-specific conditions satisfy one of the three classes of sites (a through c). **a. Are maximum concentrations of petroleum constituents in soil less than or equal to those listed in Table 1 for the specified depth below ground surface (bgs)?**	☒ Yes ☐ No ☐ NA
b. Are maximum concentrations of petroleum constituents in soil less than levels that a site specific risk assessment demonstrates will have no significant risk of adversely affecting human health?	☐ Yes ☐ No ☒ NA
c. As a result of controlling exposure through the use of mitigation measures or through the use of institutional or engineering controls, has the regulatory agency determined that the concentrations of petroleum constituents in soil will have no significant risk of adversely affecting human health?	☐ Yes ☐ No ☒ NA

ATTACHMENT 2: SUMMARY OF BASIC CASE INFORMATION (Conceptual Site Model)

Site Location/History

- The Site is located on the southwest corner of Water and Ocean Streets and is currently vacant. A Shell service station was located at the Site until 2005. An unauthorized release was reported in December 1985 following the removal of three gasoline USTs. Between July and December 2005, the station building, canopy, dispensers, and three additional USTs were removed. Between July and December 2005, the station building, canopy, dispensers, and associated USTs were removed. Land use in the vicinity of the Site is commercial.
- The Site is bounded by an active gasoline station across Water Street to the north, a bank across Ocean Street to the east, and a County parking lot to the south and west.
- A Site map showing the location of the former USTs, monitoring wells, groundwater level contours, and petroleum hydrocarbon concentrations is provided at the end of this closure review summary (Conestoga-Rovers & Associates, 2013).
- Nature of Contaminants of Concern: Petroleum hydrocarbons only.
- Source: UST system.
- Date reported: December 1985.
- Status of Release: USTs removed.

Tank Information

Tank No.	Size in Gallons	Contents	Closed in Place/ Removed/Active	Date
1-3	10,000	Gasoline	Removed	December 1985
4-6	10,000	Gasoline	Removed	July 2005

Receptors

- GW Basin: West Santa Cruz Terrace.
- Beneficial Uses: Municipal and Domestic Supply.
- Land Use Designation: Commercial.
- Public Water System: City of Santa Cruz Water Department.
- Distance to Nearest Supply Well: According to data available in GeoTracker, there are no public supply wells regulated by the California Department of Public Health within 250 feet of the defined plume boundary. No other water supply wells were identified within 250 feet of the defined plume boundary in the files reviewed. County of Santa Cruz Municipal Wells #11S1W18E, #11S1W18H, and #11S1W18G are located 370 feet east (upgradient) of the Site (Delta Environmental, 2010).
- Distance to Nearest Surface Water: There is no identified surface water within 250 feet of the defined plume boundary. The nearest surface water body, Carbonera Creek, is located approximately 820 feet northeast of the defined plume boundary. San Lorenzo River is located approximately 840 feet southwest of the defined plume boundary.

Geology/Hydrogeology

- Stratigraphy: The Site is underlain by fine-grained deposits of silt, silty fine sand, and clayey fine sand to a depth of at least 40 feet below ground surface (bgs).
- Maximum Sample Depth: 19.5 feet bgs.
- Minimum Groundwater Depth: 1.73 feet bgs at monitoring well S-9.
- Maximum Groundwater Depth: 17.05 feet bgs at monitoring well S-7.

- Current Average Depth to Groundwater: Approximately 9 feet bgs.
- Saturated Zones(s) Studied: Approximately 2 - 25 feet bgs.
- Appropriate Screen Interval: Yes.
- Groundwater Flow Direction: Southwest with an average gradient of 0.035 feet/foot (November 2012).

Monitoring Well Information

Well Designation	Date Installed	Screen Interval (feet bgs)	Depth to Water (feet bgs) (11/02/12)
S-1R	5/3/12	5 – 20	6.72
S-2R	5/4/12	5 – 20	8.94
S-3R	5/2/12	5 – 20	6.80
S-4R	5/3/12	5 – 20	6.05
S-5R	5/3/12	5 – 20	7.64
S-6R	5/2/12	5 – 20	8.36
S-7	5/7/86	2 – 18	10.91
S-9	11/13/86	3 – 20	6.50
S-10	11/13/86	3 – 20	7.62
S-13	10/11/99	5 - 20	8.81
S-14	10/11/99	NA	10.90
S-15	7/16/01	5 – 25	11.89
S-16	7/16/01	5 – 25	13.00
S-17	7/16/01	5 – 25	12.85
S-18	4/3/03	5 – 20	NM
S-19	5/3/12	5 – 20	6.08
S-20	5/4/12	5 – 20	7.17
S-21	5/2/12	5 – 20	9.32

NA: Data Not Available
NM: Not Measured

Remediation Summary

- Free Product: Reported in monitoring well S-1 from July 1988 to February 1993 with a maximum measured thickness of 0.03 feet. None reported since.
- Soil Excavation: An estimated 1,100 cubic yards of impacted soil were removed and disposed offsite in 2005. During March and April 2010, Delta oversaw excavation in two areas, Zone A in the northwestern portion of the Site, and Zone B in the southeastern portion of the Site. Zone A was excavated to a maximum depth of approximately 16 feet bgs. The depth of excavation in Zone B ranged from approximately 6 feet bgs in the southern portion to 16 feet bgs in the northern portions. Groundwater was encountered at approximately 10 feet bgs in both excavation areas, and encountered groundwater was extracted. A total of approximately 1,926 cubic yards of soil was removed from the Site during the 2010 excavation activities. In 2011, an additional 2,699 tons (approximately 2,076 cubic yards) was removed from the Site.

- In-Situ Soil Remediation: SVE was conducted from September 1994 through December 1994 which removed approximately 664 pounds of vapor-phase hydrocarbons. Starting in December 2000 through April 2001, mobile dual phase extraction was conducted at the Site. Approximately 1.81 pounds of petroleum hydrocarbons as gasoline and 0.15 pounds of MTBE were removed. From March 11, 2002 through March 15, 2002, a SVE pilot test was conducted. An estimated 25.9 pounds of petroleum hydrocarbons as gasoline, 0.3 pounds of benzene, and 5.9 pounds of MTBE were reported removed.
- Groundwater Remediation: Between February 1989 and May 1995 and between December 2001 and July 2005 groundwater extraction was utilized at the Site; removing an estimated 19 pounds of free product and 15.2 pounds of dissolved hydrocarbons.

Most Recent Concentrations of Petroleum Constituents in Soil

Constituent	Maximum 0-5 feet bgs [mg/kg (date)]	Maximum 5-10 feet bgs [mg/kg (date)]
Benzene	<2.5 (12/01/05)	<28 (11/17/05)
Ethylbenzene	30 (12/01/05)	21 (12/01/05)
Naphthalene	NA	NA
PAHs	NA	NA

NA: Not Analyzed, Not Applicable or Data Not Available
mg/kg: Milligrams per kilogram, parts per million
<: Not detected at or above stated reporting limit
PAHs: Polycyclic aromatic hydrocarbons

Most Recent Concentrations of Petroleum Constituents in Groundwater

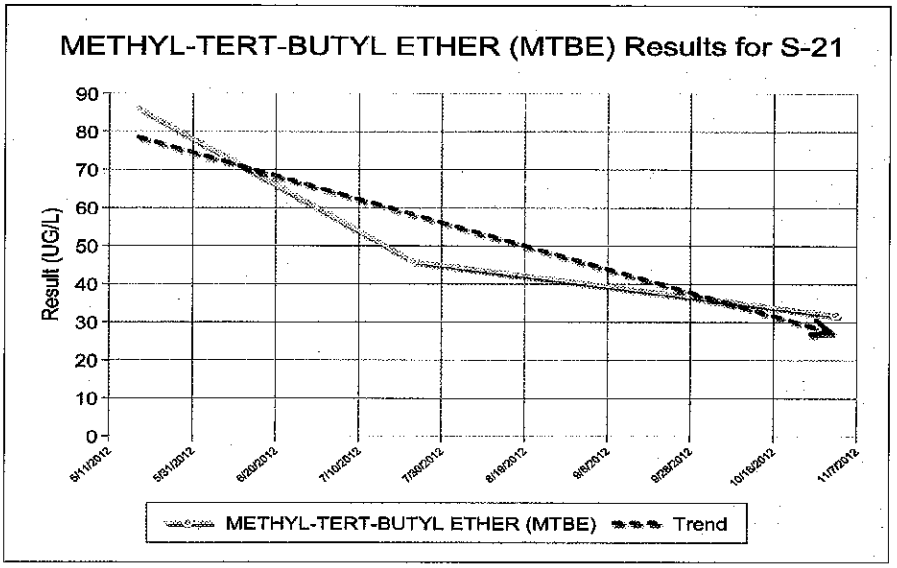
Sample	Sample Date	TPHg (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethyl-Benzene (µg/L)	Xylenes (µg/L)	MTBE (µg/L)	TBA (µg/L)
S-1R	11/02/12	740	**1.2**	<0.5	1.4	<1.0	**13**	84
S-2R	11/02/12	<50	<0.5	<0.5	<0.5	<1.0	**22**	540
S-3R	11/02/12	55	<0.5	<0.5	<0.5	<1.0	4.7	<10
S-4R	11/02/12	<50	<0.5	<0.5	<0.5	<1.0	2.1	<10
S-5R	11/02/12	<50	<0.5	<0.5	<0.5	<1.0	**10**	380
S-6R	11/02/12	90	<0.5	<0.5	<0.5	<1.0	**20**	100
S-7	07/23/12	56	<0.5	<0.5	<0.5	<1.0	**29**	490
S-9	11/02/12	<50	<0.5	<0.5	<0.5	<1.0	<0.5	<10
S-10	11/02/12	<50	<0.5	<0.5	<0.5	<1.0	1.4	<10
S-13	07/23/12	<50	<0.5	<0.5	<0.5	<1.0	2.6	<10
S-14	07/23/12	<50	<0.5	<0.5	<0.5	<1.0	**46**	<10
S-15	07/23/12	<50	<0.5	<0.5	<0.5	<1.0	<0.5	<10
S-16	07/23/12	<50	<0.5	<0.5	<0.5	<1.0	<0.5	<10
S-17	11/02/12	<50	<0.5	<0.5	<0.5	<1.0	<0.5	<10
S-18	01/30/12	<50	<0.5	<0.5	<0.5	<1.0	21	<10
S-19	11/02/12	100	<0.5	<0.5	<0.5	<1.0	3.2	11
S-20	11/02/12	<50	<0.5	<0.5	<0.5	<1.0	4.7	20
S-21	11/02/12	250	0.68	<0.5	5.3	4.7	**32**	**6,400**
WQOs	-	--	**1**	**150**	**680**	**1,750**	**5**[a]	**1,200**[b]

NA: Not Analyzed, Not Applicable or Data Not Available
µg/L: Micrograms per liter, parts per billion
<: Not detected at or above stated reporting limit
TPHg: Total petroleum hydrocarbons as gasoline
MTBE: Methyl tert-butyl ether
TBA: Tert-butyl alcohol
WQOs: Water Quality Objectives, Central Coast Regional Water Quality Control Board (Regional Water Board) Basin Plan
--: Regional Water Board Basin Plan does not have a numeric water quality objective for TPHg
[a]: Secondary maximum contaminant level (MCL)
[b]: California Department of Public Health, Response Level

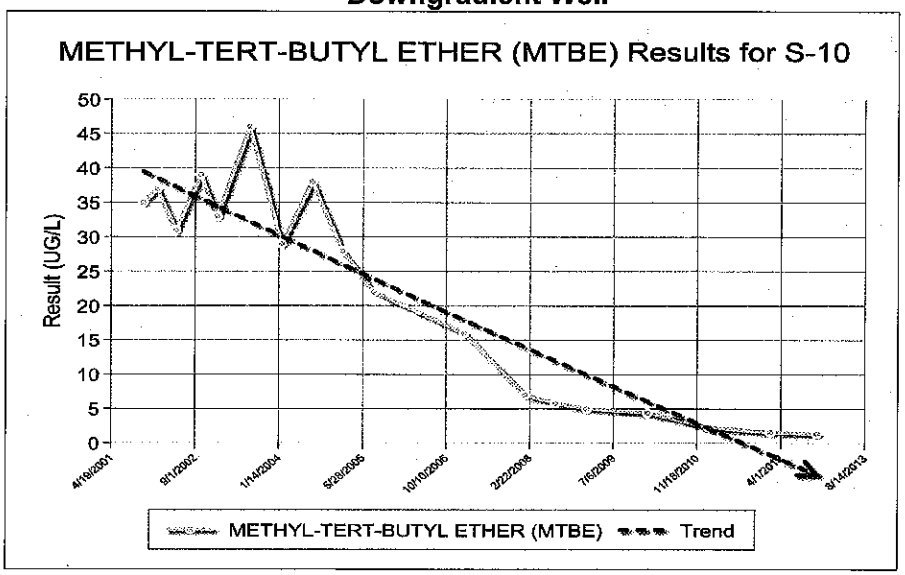
Groundwater Trends

- There are 27 years of regular groundwater monitoring data for this case. MTBE trends are shown below:

Source Area Well



Downgradient Well



Evaluation of Current Risk

- Estimate of Hydrocarbon Mass in Soil: None reported.
- Soil/Groundwater tested for MTBE: Yes.
- Oxygen Concentrations in Soil Vapor: Average of 5.0 percent at 5 feet bgs (within buildable area of site [10 foot minimum setback], excepting sample V-5 which reported a leak) (September 2010). Policy risk calculations assume a minimum 1 percent oxygen concentration. Oxygen concentrations ranged from 2.14 percent to 13.6 percent.
- Plume Length: <100 feet.
- Plume Stable or Decreasing: Yes.
- Contaminated Zone(s) Used for Drinking Water: No.
- Groundwater Risk from Residual Petroleum Hydrocarbons: The case meets Policy Criterion 1 by Class 1. The plume that exceeds water quality objectives is less than 100 feet in length.

There is no free product. The nearest water supply well or surface water body is greater than 250 feet from the defined plume boundary.

- Indoor Vapor Risk from Residual Petroleum Hydrocarbons: The case meets Policy Criterion 2a by Scenario 4 with a bioattenuation zone. The maximum benzene, ethylbenzene, and naphthalene concentrations in soil gas are less than 280,000 µg/m^3, 3,600,000 µg/m^3, and 310,000 µg/m^3, respectively, at a depth of five feet. These levels meet the Commercial soil gas criteria where the soil gas sample locations are overlain by soil containing less than 100 mg/kg of TPH where the oxygen soil vapor concentration is equal to or greater than 4 percent. Soil data used consisted of the fourteen confirmation borings located within the buildable area of the Site (10-foot minimum setback) and representative of site conditions. Furthermore, the City is requiring that the rights of way on both the north and east sides of the Site be expanded (a right hand turn lane on Water Street and a 15 foot sidewalk on Ocean Street) as a part of any development of the Site property (email communication from Reid P. Schantz, Esq., (September 25, 2013).
- Direct Contact Risk from Residual Petroleum Hydrocarbons: The case meets Policy Criterion 3a. Maximum concentrations in soil are less than those in Policy Table 1 for Commercial/Industrial use, and the concentration limits for a Utility Worker are not exceeded. There are no soil sample results in the case record for naphthalene. However, the relative concentration of naphthalene in soil can be conservatively estimated using the published relative concentrations of naphthalene and benzene in gasoline. Taken from Potter and Simmons (1998), gasoline mixtures contain approximately 2 percent benzene and 0.25 percent naphthalene. Therefore, benzene can be directly substituted for naphthalene concentrations with a safety factor of eight. Benzene concentrations from the Site are below the naphthalene thresholds in Policy Table 1. Therefore, the estimated naphthalene concentrations meet the thresholds in Table 1 and the Policy criteria for direct contact by a factor of eight. It is highly unlikely that naphthalene concentrations in the soil, if any, exceed the threshold.

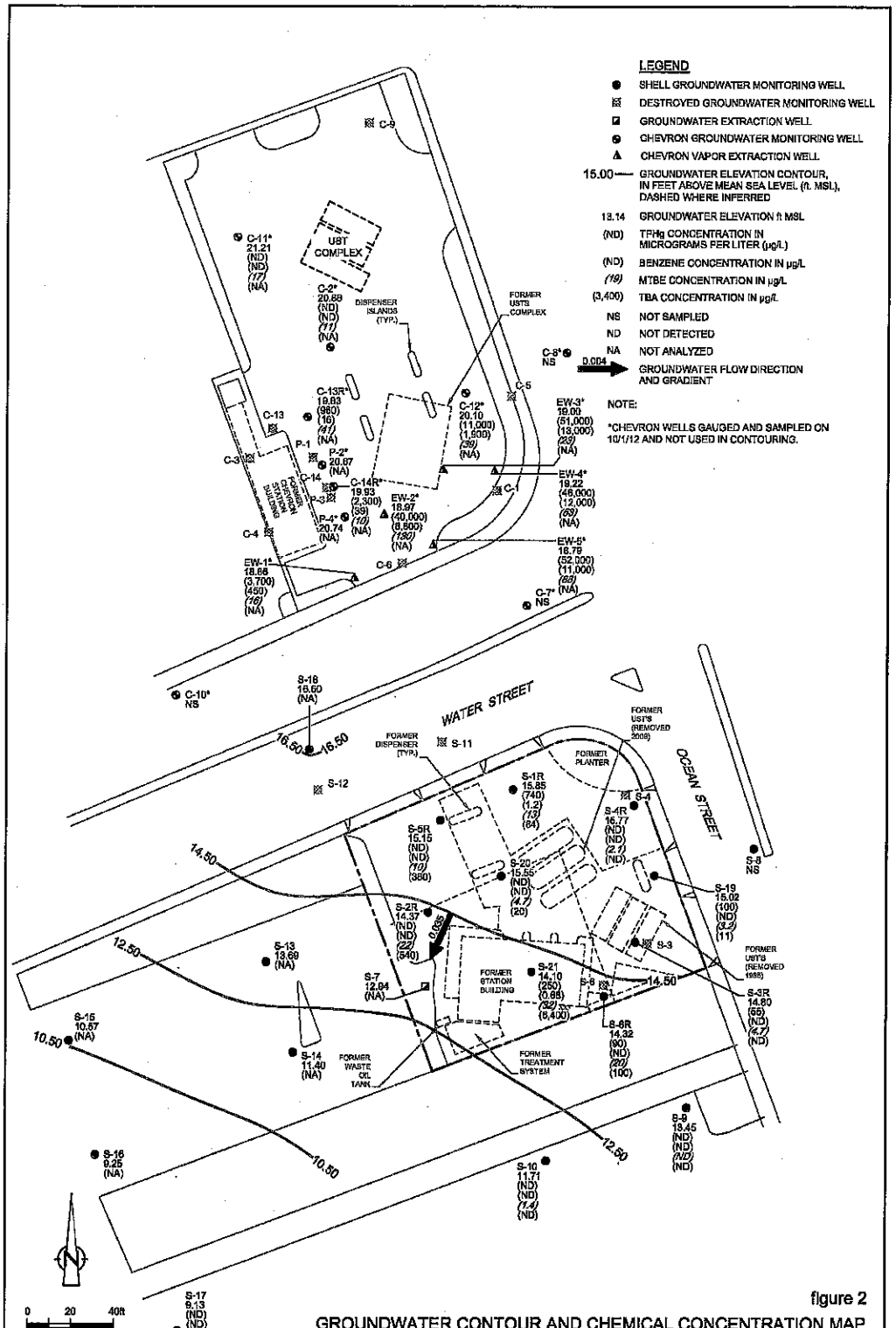


figure 2

GROUNDWATER CONTOUR AND CHEMICAL CONCENTRATION MAP
NOVEMBER 2, 2012
FORMER SHELL SERVICE STATION
745 Ocean Street, Santa Cruz, California

060601-2012(012)GN-SC001 JAN 10/2013